EXHIBIT A

BOEING®
ENVIRONMENTAL TECHNOTES

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Hexavalent Chromium

On April 2, 2003, the U.S. Court of Appeals for the Third Circuit directed OSHA to publish a proposed hexavalent chromium rule no later than October 4, 2004 and a final standard no later than January 18, 2006. The Court issued the ruling based on a recommendation from a court-appointed mediator trying to resolve a suit from Public Citizen Health Research Group seeking to require OSHA to promulgate a new standard on chromium.

The major human illnesses associated with occupational exposure to hexavalent chromium are lung cancer and dermatosis. The current OSHA Permissible Exposure Limit (PEL) for $Cr^{+}6$ is 52 $\mu g/m^3$ (ceiling limit). OSHA is currently considering a PEL in the range of 0.25 $\mu g/m^3$ to 10 $\mu g/m^3$ (time weighted average) with a proposed final rule date of 1/18/2006 (Fig. 1).

This would be a significant reduction to the current PEL. The OSHA expanded standard will likely include enhanced training, medical surveillance, enhanced personal protective equipment and restricted areas, etc.

The Respiratory Protection and Air Contaminants Standards as well as long-standing OSHA policy states that–engineering and administrative controls must be implemented first, when such controls are feasible. Engineering controls involve the use of local exhaust ventilation, general ventilation, isolation of the worker and enclosure of the source of emissions, process modifications, equipment modifications and substitution of non-hazardous chemicals.

The EPA regulates chromium and its compounds under the Clean Air Act (CAA) [MACT "Residual Risk" activity that may, eventually, propose additional requirements on aerospace, particularly in the paint removal area], Clean Water Act (CWA), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA),

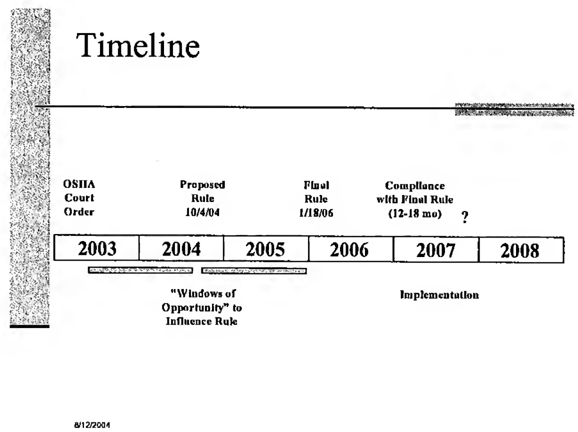

Fig. 1 – OSHA Hexavalent Chromium Regulatory Timeline

Superfund Amendments and Reauthorization Act (SARA), and Toxic Substances Control Act (TSCA).

All this adds up to a major effort for the coatings industry and the OEMs to find a suitable replacement for chromium

Defining the Problem

In response to the pending OSHA regulatory activity and to ensure our workers are protected, The Boeing Company established an Enterprise chrome study team. Executive level sponsors provided the resources to assure timely coordination and

communication across the company's operating divisions.

The Enterprise team has sub-teams focusing on the following tasks:

<u>Process Data</u>

- Assemble and consolidate enterprise data on chromium use by process, location, exposure data and other variables
- Characterize enterprise exposure data against selected criteria and anticipated exposure levels

<u>Evaluation and Controls</u>

- Identify "high impact" issues and opportunities for chrome elimination and/or reduction, or workplace controls

<u>Strategies</u>

- Provide recommended strategies and ensure that technical resources and support are provided to government relations specialists in their effort to address near-term OSHA regulatory activity

<u>Communications</u>

- Provide quarterly updates to the Boeing Operations Council (BOC) and SHEA Process Council
- Share enterprise data, best practice opportunities, and areas of research with affected organizations

This team effort requires expertise from Boeing Commercial Aircraft (BCA) and Integrated Defense Systems (IDS) SHEA, Shared Services Group-Workplace Services, Engineering, Manufacturing operations and facilities at numerous sites across the U.S.

As expected, the initial report from the Process Data sub-team identified many aerospace processes (Fig.2) and materials that bring a potential risk of exposure to hexavalent chrome. They include:

- Painting/Coating
- Paint/Coating Removal (Includes Electrical
- Paint/Coating Scuff Sanding
- Welding Stainless Steel
- Electroplating
- Anodizing
- Surface Prep (Physical/Chemical)
- Hazardous Material/Waste Handling (Paint Booth Filters, etc.)
- Powdered Chemical Additions to Tanks
- Construction/Demolition
- High Chromium Nickel Alloys

and

- Dry Film Lubricants.

Fig. 2 – Welding – Possible Chrome Fumes

Mitigation Approach

It would be most desirable to eliminate the offending agent rather than use process controls to achieve compliance. But as illustrated by the list above, hexavalent chrome is ubiquitous in aerospace materials and processes. And it is so primarily because of its demonstrated effectiveness as a corrosion control agent.

For over fifty years hexavalent chromium has been used as a corrosion-inhibiting compound for the protection of metal surfaces. Its high solubility makes it an ideal corrosion inhibitor in paints, but environmental and health issues may arise if proper safety and health measures are not followed. In the aerospace industry hexavalent chromium is used in conversion coatings and primers to protect the aluminum structure from corrosion. As long as aircraft are manufactured with aluminum, the need to protect aluminum from corrosion will be a critical issue (Fig. 3 & 4)

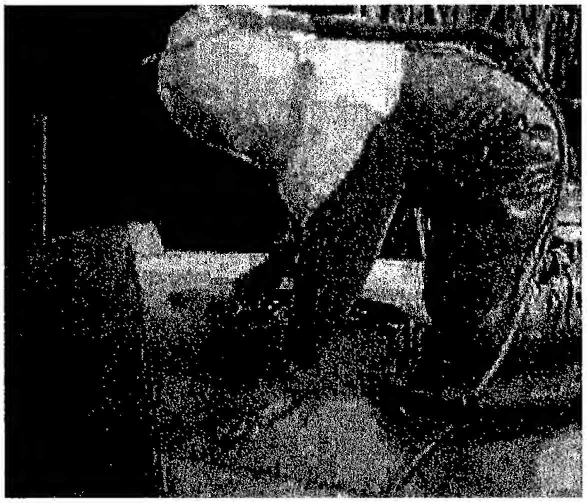

Fig. 3 - Aerospace worker scuff sanding primer containing hexavalent chrome

Eliminating chrome in aircraft paints and coatings would greatly reduce compliance issues associated with the new OSHA rules. However, no one wants to sacrifice corrosion resistance when implementing a non-chrome corrosion protective coating.

The search for an environmentally friendly chrome replacement with performance equal to chrome poses a significant challenge to the coatings industry. The Boeing Company has funded a continuing internal effort to develop non-chrome corrosion inhibitors suitable for protecting aluminum aircraft structure, and has tested over one hundred non-chrome primers over the past few years. Developing and demonstrating effective chrome free primer performance for all of aluminum alloys typically used on aircraft is a difficult assignment. While laboratory accelerated corrosion methods are used in the industry, operational testing is needed as a real life method of determining chrome free primers effectiveness.

Boeing had the opportunity to lead a non-chrome primer evaluation program sponsored by the Joint Group for Pollution Prevention (JG-PP) beginning in 1995. The charter of this effort was to evaluate existing state-of-the art non-chrome primer technology, and perform an extensive field evaluation of the leading candidate coatings.

Multiple non-chrome primers were tested to the requirements of the chromated primers, and the best primers were found to be approximately 80% as good as the chromate control in corrosion protection. Even though the non-chrome primer did not meet the laboratory testing requirements of chromated primer, the stakeholders chose to proceed with operational testing. The original plan was to evaluate operational performance for two years, but the project was extended since no discernable differences were noted after the initial two years period. Non-chrome primers were ultimately test flown on multiple military aircraft for up to six years with no discernible corrosion performance deficiencies.

Additional military aircraft were painted in 2000 and 2001 and continue to be monitored for performance. To minimize risk, the primers were only applied to external surfaces that can be easily inspected for corrosion. Internal structure, where most corrosion occurs, will someday need to be field evaluated with non-chrome primers. Latest field evaluation of the JG-PP aircraft show the non-chrome primers to be performing as good as the chromated primers when used with a chromate conversion coating pretreatment.

Most aerospace aluminum structures are protected with chrome in two ways. First the aluminum is treated with a chromate conversion coating. The conversion coating provides some corrosion protection and improves subsequent paint adhesion. The structure is then coated with a chromated primer. The chromated primer provides the majority of the corrosion protection for the aluminum structure. The goal of providing a total non-chrome corrosion protection system for aerospace structures continues to be an elusive objective.

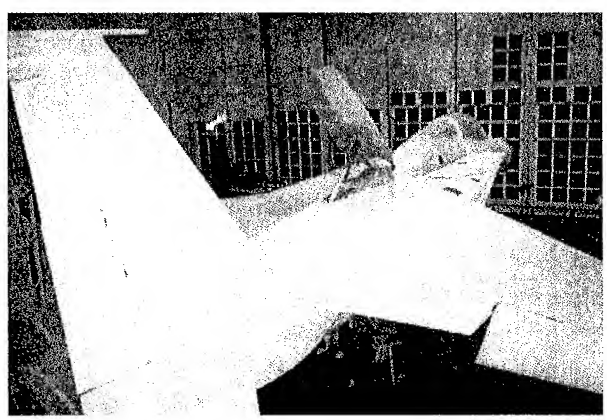

Fig. 4 - JG-PP F-15 test aircraft painted with chrome free primer on half of the aircraft

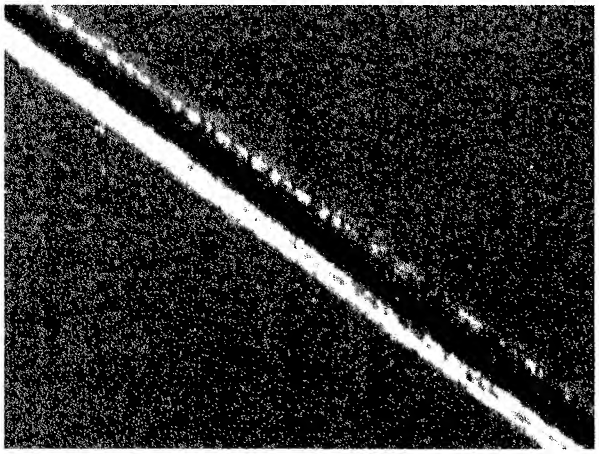

Fig. 5 - Shiny scribe using chromate inhibitors

Although chrome has been used for many years, its mechanism of corrosion protection has only recently been understood. Understanding the mechanism of the chrome free corrosion inhibitors is needed to aid further development efforts. For example, during corrosion testing, scribes through the coating to the base metal appear shiny with chromate corrosion inhibitors (Fig. 5).

However, some effective chrome free inhibitors can produce a dark scribe during corrosion testing (Fig. 6). This is an acceptable condition because the dark scribes don't contain corrosion products. Dark scribes just indicate that a different corrosion protection mechanism is occurring with the chrome free corrosion inhibitors.

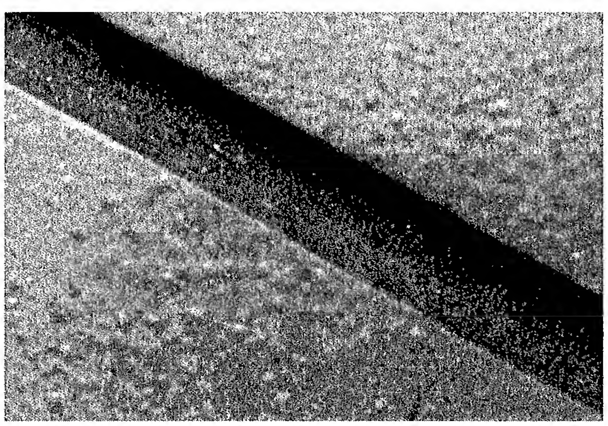

Fig. 6 - Dark scribe using chromate free inhibitors

The impending OSHA expanded chrome standard will not only impact Boeing, but will also impact our suppliers who use chrome either in conversion coatings or primers. Boeing would like to have a suitable chrome replacement approved for use for our suppliers so we can mitigate the costs associated with implementing the added controls to comply with the expanded standard. Reducing the amount of hazardous materials used in our products makes good business sense from an environmental and corporate citizen standpoint (Fig. 7). Boeing is committed to reducing hazardous materials used on its aircraft.

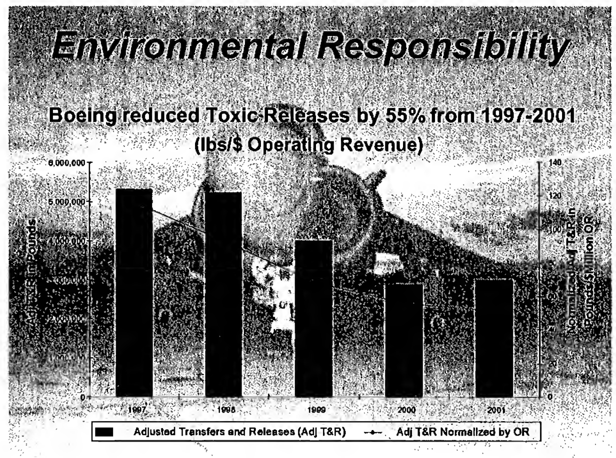

Fig. 7 - Graph showing Boeing's reduced toxic releases

The task of finding an effective replacement for chromium as a corrosion inhibitor is a daunting one. Progress continues to be made in this area. As the clock ticks down to the impending OSHA expanded chromium standard, the aerospace industry continues to search for a safe and effective replacement for hexavalent chromium.

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